

The vortex ring formation in a fumarole of the KA vent at Usu volcano

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I show a series of photographs of a vortex ring, which were taken accidentally during the eruption of Usu volcano 2000. Because vortex rings on volcanoes only appear rarely and transiently, these photos draw special attention of inhabitants and also volcanologists.

At the northwestern lower slope of Usu volcano, several tens explosions occurred on March and April 2000. After this period, continuous fumarolic activities with numerous small bursting-type explosions were observed at the major four vents, including the KA vent that released vortex rings. The KA vent was ellipsoidal, 150 m in diameter, and was water-saturated, having mud at the floor.

On 14 October 2000, sequential photographs of the vortex ring were accidentally taken by an inhabitant and also automatically recorded by the video camera installed by Japan Meteorological Agency.

According to the images and the movie, the vortex ring had a symmetrical shape and isolated from the fumaroles. The diameter was about 100 m at the height of 150 m from KA crater rim, and became larger with time. The vortex ring ascended for about several tens meters with horizontal movement to north-northwest at a speed of several meters per second.

The direction and speed of horizontal movement is consistent with those of wind at that time. Before the appearance of the vortex ring, no prominent explosions occurred at the KA vent.

Acknowledgement I am very grateful to Kiyomu Tomita who provided the photos, and the member of Sapporo District, Japan Meteorological Agency for sharing their data with us, and giving us permission to publish them.

